Technical Assistance

In Mission Assignment Letter #5, FEMA asked the Corps to provide technical assistance to state and local interests as requested. FEMA specified that reimbursement for technical assistance expenses not exceed $100,000 unless approved by the FEMA regional director, but it later increased the amount to $1,750,000. At FEMA's direction, on 23 and 24 October, Sacramento and San Francisco district mechanical and structural engineers inspected four state and county bridges (Fruitvale Avenue Railroad Bridge, Miller Sweeney Bridge, High Street Bridge, and Park Street Bridge) in Alameda County to determine the extent of damage. FEMA indicated that the Alameda bridge inspections were a technical assistance mission paid for entirely with federal funds.[94]

The Sacramento District provided engineers to inspect the structural integrity of piers for safety and for ferry use at the following sites: Todd Shipyard at Jack London Square in Alameda, the container pier at the south end of Richmond Inner Harbor, Vallejo Pier, Berkeley Marina (part of the original mission assignment), San Leandro Marina, and Emeryville Marina. The San Francisco District also provided two structural engineers to inspect buildings owned by the Santa Cruz Department of Parks and Recreation.[95]

A large part of the Corps' technical assistance effort involved geotechnical support. The earthquake triggered thousands of landslides in the north central portion of California's coastal ranges from the San Francisco Bay area to the Big Sur coastline. Most of the landslides occurred near the earthquake's epicenter in the Santa Cruz Mountains. The steep mountains, which receive up to 60 inches of rain per year, historically produce slides during heavy seasonal rains and earthquakes.

The landslides were predominantly shallow (10 feet or less) rock falls, rock slides, and soil slides. Typically, these slides pushed quickly down steep slopes, depositing boulders and finer grained material. Slides killed two people during

or immediately after the earthquake. Large blocks of soil also broke away and some of these block slides showed evidence of continued or renewed movement as the result of rainfall in the mountains 10 days after the earthquake.[96]

County officials and residents worried that aftershocks and winter storms could lead to more landslides, further destruction of property, and loss of life. Santa Cruz County officials appealed to state and federal agencies and to their congressional representatives for assistance in evaluating this possible geologic hazard in the area.

In the first days after the earthquake, an on-site Waterways Experiment Station (WES) team consisting of personnel from the Geotechnical Laboratory and Structures Laboratory evaluated the earthquake's effects. During the week of 30 October, personnel from the two laboratories supported the FEMA disaster mitigation team at the disaster field office. On 13 November, a Geotechnical Laboratory geologist assisted FEMA and the South Pacific Division in mapping and planning mitigation action for a major landslide in the Santa Cruz Mountains.[97]

At a public meeting hosted by California Congressman Leon E. Panetta on 28 October 1989, officials offered federal technical assistance for evaluating the geologic hazards posed by the slides in Santa Cruz County. Representatives of the Corps of Engineers, the California Division of Mines and Geology, and the county met on 3 November to identify the scope of the technical assistance required. Participants identified technical support for ongoing investigations of massive slides in the Santa Cruz Mountains as the most critical need.

A few days later, on 8 November, representatives of FEMA, the U.S. Geological Survey, the Corps, the California State Office of Emergency Services, and Santa Cruz County met to discuss the county's request for assistance. Soon after, the county formally requested, through the Office of Emergency Services, that FEMA provide technical assistance for the geologic hazards analysis study.[98] FEMA then directed the Corps to provide technical assistance at a cost of $1,350,000 to Santa Cruz County to investigate geologic hazards resulting from the earthquake. FEMA specified the need for geotechnical advice and resource support to Santa Cruz County in the following areas: survey and mapping of areawide

hazards, foundation investigation and instrumentation, and preliminary slope stability modeling and geologic hazards analysis to determine public-safety hazards and emergency measures required.

An interagency technical advisory group (TAG) was established to perform the investigation, which included representatives of Santa Cruz County, the U.S. Geological Survey, the California Division of Mines and Geology, and the San Francisco District. The district provided a project manager to oversee scheduling and funding, to administer Corps engineering services contracts, and to coordinate participation from other Corps elements such as the South Pacific Division and the Waterways Experiment Station.[99]

At the request of the county, FEMA funded the studies and reviewed the overall objective and scope. The Corps provided technical and contractual support and served as project manager. The technical advisory group made up of representatives of the county, the U.S. Geological Survey, and the Corps met regularly to advise the county and the project manager on the scope of the mission, various technical concerns, and data analysis and interpretation.

The analysis would be conducted in three phases, the first of which involved identifying and surveying the slides. The second phase involved geologic characterization and installation of monitoring instruments, and the third phase was for data reduction and analysis. Phase one mapping began soon after the earthquake and was 95 percent complete by 22 November 1989. Surveys of the slides began on 15 November, and 10 of the 12 surveys were completed by 22 November. The last two were completed by 7 December. On 6 December, a contract was awarded to William Cotton and Associates to perform the geologic characterization of and install the instrumentation (phase two) in the first two landslides selected for the detailed study (Villa del Monte complex and Schultheis Road landslide). Work on the geologic characterization of the most critical of the slides began 8 December, and the drilling and instrumentation work was scheduled to begin 10 days later.[100]